#12/Appeal Brief
D. Evans
5.9.03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:
Kent E. Regnier

SERIAL NO.: 09/482,135 **EXAMINER:** C. Prasad

FILED: January 12, 2000 **ART UNIT:** 2839

FOR: CONNECTOR HAVING SUPPORTIVE BARRIER COMPONENT

APPEAL BRIEF FOR APPLICANTS

Mail Stop Appeal Briefs - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING

I hereby certify that this correspondence along with any documents referred to as being attached, is being deposited with the United States Postal Service on the date shown below as first class mail, postage prepaid, in an envelope addressed to the above address.

Date: May 2, 2003

Kerri Richardson

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants:	Kent E. Regnier
Application:	CONNECTOR HAVING SUPPORTIVE BARRIER COMPONENTS
Serial No.:	09/482,135
Filing Date:	January 12, 2000
Art Unit:	2839
Examiner:	C. Prasad
Case:	99-247 US

APPEAL BRIEF FOR APPLICANTS

This is an appeal from a final rejection of claims 1-27 that are pending in the present application. The final rejection was made in an Official Action issued in connection with the present application on December 30, 2002, from which a Notice of Appeal was mailed on February 27, 2003 and was received by the Patent Office on March 4, 2003. In accordance with 37 C.F.R. § 1.192(c)(9), the claims pending in the present application and involved in this Appeal are set forth in the attached Appendix A.

I. REAL PARTY IN INTEREST

The real party in interest is Molex Incorporated, a Delaware corporation having a place of business at 2222 Wellington Court, Lisle, Illinois 60532. Molex Incorporated is the real party in interest by virtue of an Assignment executed by the applicant on January 11, 2000 and recorded in connection with the present application in the United States Patent and Trademark Office on January 12, 2000 on Patent Reel No. 010492, Frame No. 0060.

II. RELATED APPEALS AND INTERFERENCES

Applicant and Molex Incorporated, the assignee of the present application, are not aware of any other appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal of the present application.

III. STATUS OF THE CLAIMS

The status of the claims in the present application is as follows:

1. Total claims: 1-27.
2. Claims canceled: None.
3. Claims withdrawn from consideration but not canceled: 28-30.
4. Claims pending: 1-27.
5. Claims allowed: None.
6. Claims objected to: None.
7. Claims rejected: 1-27.
8. Claims appealed: 1-27.

IV. STATUS OF AMENDMENTS

The applicant did not file an Amendment Under 37 C.F.R. § 1.116 in response to the December 30, 2002 Official Action finally rejecting claims 1-27.

V. SUMMARY OF THE INVENTION

A. Background

Electronic packages having miniature and microminiature electronic components are characterized by being especially small, dense and more efficient, leading to many challenges, including those associated with physically and electrically connecting package components together.

Examples of packages include chips which are characterized by having a high circuit count in a small area. Often, these dense conditions include providing an array of terminals or contacts which are closely spaced from one another and which must remain electrically insulated from one another so as to provide a plurality of discrete electrical connections, typically in an ordered, predetermined array. An example of a connector of this type is one having a land grid array of contact pads.

An approach which has been developed for manufacturing such miniature and microminiature contact systems involves electroforming using a gold wire bonding preform. In this approach, the printed circuit board component is manufactured, as is the gold wire bonding preform. The preform is attached to the board, followed by plating and electroforming the contact, requiring approximately a two hour plating process in order to plate the contact finish. This process next etches and individualizes the contact. Overall, this process includes mask placement, followed by paste placement and solder ball placement, with attendant reflow. Thereafter, removal from the panel is carried out. This technology is exemplified by U.S. Patents No. 5,476,211 and No. 5,864,946. A characteristic of this technology is that it is suitable for low normal force systems of about 1 gram per mil. Another characteristic of this approach is that the contacts have limited compliance, the total range being 0.015 inch, and the working range being 0.008 inch. The electrical characteristics are as follows: self-inductance of 1.78 nh, loop inductance of 2.0 nh, and impedance of 90 ohms. Systems of this type are also characterized as being expensive.

While the approach summarized in the preceding paragraph is useful in addressing miniaturization and microminiaturization of contact systems, its attendant disadvantages, especially its limited compliance and cost, reduce its desirability. Traditional contact system manufacturing approaches can be problematic when miniaturization to this degree is to be practiced. In addition to

the complications which arise in manufacture and assembly of such small components, they also can be susceptible to undesired flow of liquids therethrough. For example, soldering flux can flow from a face of the grid being subjected to soldering to an opposite face of the grid which is to provide unsoldered contact functions. This latter concern is especially of interest in those applications where the connector does not experience contact wiping.

B. The Invention Of The Present Application

In accordance with the present invention, electrical connectors are provided which have a plurality of electrically conductive contacts within a dielectric housing. The electrically conductive contacts are mounted within receptacles or through holes which are arranged in a predetermined pattern so as to provide a desired number and positioning of the plurality of electrically conductive contacts. A supportive barrier member is associated with each of the mounts of the electrically conductive contacts within the dielectric housing. The barrier member is sized, shaped, selected and positioned so as to substantially prevent passage of liquid through the assembled connector, especially with respect to passage of soldering flux through the connector and from one face to the other.

The electrical connector of the present invention connects a first electronic component (not shown) to a second electronic component (not shown). As is well-known in the art, the first electronic component has an array of terminals, typically contact pad terminals, on a surface thereof, while the second electronic component has a similar array of terminals, which can be contact pads and the like, on a surface thereof. A typical connector in accordance with the present invention is designed to be positioned between such electronic components and provide required electrical communication between them.

Illustrated electrical connector 21 includes a dielectric housing 22. The housing can be essentially a single piece unit, typically molded as a unitary member. Alternatively, the dielectric housing can be comprised of a series of elongated housing components or strips 23, sometimes referred to as sticks (FIGS. 5 and 6) which are assembled together within a suitable frame such as generally shown at 24 in FIG. 1.

However constructed, the dielectric housing has a plurality of substantially open receptacles 25 (FIG. 2). When the connector 21 is properly disposed between the electronic components, the receptacles 25 substantially align between corresponding contact pads or the like (not shown) of these components. In a typical arrangement, these two electronic components can have identically-spaced arrays of contacts or terminals, which arrays preferably correspond to the receptacles of the housing. Dielectric housing 22 has a first surface 26, shown as a top surface, and a second surface 27, shown as a bottom surface. In use, the top surface is positioned generally adjacent a first electronic component, and the bottom surface is positioned generally adjacent a second electronic component.

An electrically conductive contact element is disposed within at least one of the receptacles 25. An inserted, but not formed, contact element is generally designated as 28 in FIGS. 2, 3 and 4. In the illustrated embodiment, the contact 28 is an assembly of a shaft 31 and a pad 32. Electrically conductive contact element 28 alternatively can be made as a single piece member which is not an assembled member. In the preferred embodiment which is illustrated, the longitudinal axis of the unformed contact element 28 generally coincides with a through axis "A" of the receptacle 25. This is the as-assembled orientation.

With more particular reference to the assembly illustrated in FIGS. 2, 3 and 4, a

retention member 33 is included. Retention member 33 is positioned within the substantially open receptacle 25 so as to be maintained therewithin after assembly and forming has been completed. This retention member also functions as a barrier to liquid passage through the receptacle 25.

In this illustrated embodiment, the retention member 33 has an opening 34 which receives the shaft 31 of contact element 28. Illustrated opening 34 is coaxial with through axis "A" and is of a size which cooperates with the outer surface of the shaft 31 in order to provide a force fit therebetween. It also is preferred that the external surface of retention member 33 have a force fit with respect to a portion of the substantially open receptacle 25. When these preferred force fits are provided, the retention member 33 functions as an assembly aid during the assembly procedure and as an essentially advantageous retention and barrier member after assembly and forming is completed.

In the illustrated embodiment, the receptacle 25 includes a stop surface 35. The retention member 33 is positioned between this stop surface 35 and a portion of the electrically conductive contact 28. In the illustrated embodiment, this portion of the contact is an abutment surface 36 of the pad 32. In a further preferred arrangement, the receptacle 25 has a secondary stop surface 37 which can engage another portion of abutment surface 36 of the contact pad 32. During assembly, the retention member 33 can engage temporarily this secondary stop surface 37 until proper seating is achieved between the retention member 33 and the stop surface 35.

The close fit or force fit provided by the retention member imparts an ungapped condition to the electrical connector assembly. That is, there is a close fit and thus no gaps between the outside surface of the shaft 31 and the opening 34 of the retention member 33. Likewise, this condition exists between the outside surface of the retention member 33 and the receptacle 25.

With more particular reference to this latter element of the ungapped condition, it is preferred that there be an ungapped force fit between the outside surface of the retention member 33, which is cylindrical in the illustrated embodiment, and the anterior surface 41 of the receptacle which is between the stop surface 35 and the secondary stop surface 37. It is further preferred that the thickness of the retention member 33 be such that there is an ungapped force fit of the retention member 33 between the stop surface 35 and the abutment surface 36 of the contact element 28. It is contemplated that the retention member may be oversized with respect to its nesting position within the housing receptacle and thus will be compressed somewhat in the fully assembled condition of the connector.

The function provided by the retention member 33 is facilitated by having it constructed of a generally resilient material. It can be an extruded elastomeric component. In order to withstand typical package assembly conditions, the material of the retention member is to resist 219°C for at least 40 seconds. Materials suitable for the retention member include Viton, Neoprene, silicone rubber and the like.

Retention member 33 prevents passage of liquids such as solder flux which would be present during assembly at pads 32 and which could otherwise flow through the receptacles 25 and onto the shaft 31 at or above the first or top surface 26 of the housing 22. The retention member further supports the contact element 28 in order to thereby add stability to the contact during manufacture but especially during use. Retention member 33 provides for a low stress press fit in order to address possible warpage of the device and while also minimizing the likelihood of any bending of shafts 31 during insertion. After full assembly, the retention member 33 thus provides barrier properties while also holding the contact element compliantly and rigidly.

In the illustrated preferred embodiment, the shaft 31 is formed after assembly into the housing. This is accomplished by bending shaft 31, to an orientation which is at an acute angle with respect to through access "A" as generally shown in FIG. 5 through FIG. 8. With the shafts 31 thus bent, the resulting formed electrically conductive contact elements 38 provide a retained contact array which can be oriented as needed. For example, it is possible to align the formed contact elements 38 according to an in-line arrangement as shown in FIG. 5 and FIG. 6. It will be noted particularly from FIG. 5 that the contacts themselves remain separated from each other by a thickness of the dielectric housing 22. This is made possible, at least in part, because the open receptacles 25 need not be so large as to accommodate post-formed contact elements. Instead, because the contact elements are inserted prior to forming same, the open receptacles 25 only need accommodate the unbent or unformed contact elements 28 during insertion. An array arrangement such as shown in FIG. 5 and FIG. 6 is suitable for a grid of 0.050 inch by 0.050 inch, for example.

In a typical use of the thus formed electrical connector 21, the pads 32 will be exposed to soldering conditions, which includes exposure to soldering flux. The soldering flux will tend to flow or wick into the receptacles 25, followed by subsequent passage toward the first or top surface 26 and more particularly onto the shafts 31 formed as the terminals 39. It will be appreciated that the presence of a liquid such a soldering flux on the terminals 39 will interfere with the expected electrical properties of the connector. This problem is especially of concern in those applications in which there is very little relative movement between the terminals and an opposing component which might otherwise somewhat effectively wipe the liquid from the terminals. In addition, this structure according to the invention imparts no significant loading on the housing, which is a feature of the mechanical properties of the assembly in accordance with the invention.

VI. ISSUES ON APPEAL

This issues on appeal are as follows:

A. Whether independent claims 1 and 22, and dependent claims 2-11, 13-21 and 23-27 are anticipated under 35 U.S.C. § 102(b) by United States Patent No. 5,098,311 ("Roath et al.").

B. Whether dependent claim 12 is rendered obvious under 35 U.S.C. § 103(a) by Roath et al. in view of United States Patent No. 5,713,744 ("Laub").

VII. GROUPING OF CLAIMS

In rejecting the claims, the Examiner has separated the claims into two groups. The first group includes claims 1-11 and 13-27 and the second group includes claim 12. With respect to the first group of claims, claim 1 would be representative of those claims. Claim 12 would be representative of the second claim group.

VIII. ARGUMENT

A. Claims On Appeal

All of the claims involved in this Appeal were finally rejected in the Official Action of December 30, 2002 because the Examiner maintained that claims 1-11 and 13-27 were anticipated under 35 U.S.C. § 102(b) by United States Patent No. 5,098,311 ("Roath et al.") and that claim 12 was rendered obvious under 35 U.S.C. § 103(a) by Roath et al. in view of United States Patent No. 5,713,744 ("Laub"). It is the final rejection of those claims that resulted in the filing of this Appeal.

The claims on appeal are set forth in Appendix A. These claims are all directed to

various embodiments of an electrical connector.

The claim indicated to be representative of the claims the Examiner has grouped in the first group of claims, *i.e.*, claim 1, recites an electrical connector comprising a dielectric housing having a plurality of substantially open receptacles arranged in an array which is suitable for an electrical connector. Each receptacle has a through axis. A plurality of electrically conductive contacts are positioned within at least some of said receptacles so as to provide an array of contacts arranged to be suitable for an electrical connector. A plurality of retention members are within the receptacle, at least one of said retention members engaging at least one of said contacts so as to impart an ungapped condition to the connector at the location of the retention member within the housing. The ungapped condition of the connector substantially prevents passage of liquid through the open receptacles having said retention members therewithin.

Claim 12, which is dependent on independent claim 1, is representative of those claims that have been included by the Examiner in the second group. Claim 12 further defines an electrical connector wherein said dielectric housing includes a plurality of housing component strips.

B. The Cited Reference

The Examiner relied on two references in rejecting the appealed claims: United States Patent No. 5,098,311 ("Roath et al.") and United States Patent No. 5,713,744 ("Laub").

1. United States Patent No. 5,098,311 (Roath et al.):

The Roath et al. reference discloses a hermaphroditic interconnect system. The interconnect system 10 includes a pair of connectors 11T, 11B. Each connector 11T, 11B includes a connector housing 12T, 12 B and header type connectors 73, 74. Each of the header type connectors 73, 74 contain a plurality of contacts 13 within a header body 75. Each of the header

type connectors 73, 74 is mated to a hollow recess 77 in the respective connector housing 12T, 12B. When the header type connectors 73, 74 are mated to their respective connector housings, the contact portions 13c of the terminals are inserted through openings 67 located in a bottom wall 68 of the respective connector housing 12T, 12B. When the header type connectors 73, 74 are mated to its respective connector housing 12T, 12B, a bump 78 is used to allow for an interference fit between the header type connectors and the hollow recess 77 of the connector housings (see Fig. 6B). Thus, a gapped condition exists between the header type connector, which contains the contacts 13, and the connector housing.

2. United States Patent No. 5,713,744 ("Laub"):

The Laub reference discloses an integrated circuit socket for ball grid array and land grid array lead styles.

C. The Rejection of Claims 1-11 and 13-27 Under 35 U.S.C. § 102(b) Should Be Reversed

The Examiner has asserted that claims 1-11 and 13-27 are anticipated under 35 U.S.C. § 102(b) as being unpatentable over United States Patent No. 5,098,311 ("Roath et al."). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegall Bros. v. Union Oil Co. of Calif.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Because Roath et al. fails to recite each and every element set forth in the rejected claims, claims 1-11 and 13-27 are not anticipated by Roath et al.

Representative claim 1 recites an electrical connector comprising a dielectric housing having a plurality of substantially open receptacles arranged in an array which is suitable for an electrical connector. Each receptacle has a through axis. A plurality of electrically conductive

contacts are positioned within at least some of said receptacles so as to provide an array of contacts arranged to be suitable for an electrical connector. A plurality of retention members are within the receptacle, at least one of said retention members engaging at least one of said contacts so as to impart an ungapped condition to the connector at the location of the retention member within the housing. The ungapped condition of the connector substantially prevents passage of liquid through the open receptacles having said retention members therewithin.

The Examiner characterizes Roath et al. as disclosing an electrical connector having a unitary housing 11B, the housing having a plurality of receptacles; a plurality of contacts 13 and a plurality of resilient retention members 73, 74 wherein each contact fills an opening in the retention member to provide an ungapped condition to the connector at the location of the connector in the housing.

The Examiner's characterization of Roath et al. has a number of critical flaws, any one of which would be sufficient to conclude that Roath et al. does not anticipate representative claim 1 of the present invention. First, the Examiner's characterization of Roath et al. necessarily assumes the following correspondence of structure in Roath et al. to the structure recited in representative claim 1 of the present invention: that the connector housings 12T or 12 B are analogous to the dielectric housing of the present invention, that the openings 67 in the bottom wall 68 of the connector housings of Roath et al. are analogous to the plurality of substantially open receptacles arranged in an array of the present invention and that the header type connectors 73 or 74 are analogous to the retention members of the present invention.

With this understanding of how the Examiner is applying the structure of Roath et al. to the structure recited in representative claim 1 of the present invention, it is clear that Roath et al.

has at least the following shortcomings. First, the "retention members" of Roath et al. are not within the receptacles of Roath et al. Rather, the header type connectors 73, 74 are within the hollow recess 77 of the housings, and not within the openings 67 of the housings. Instead, the only structure of Roath et al. that resides within the openings 67 is the contacts 13.[1] Moreover, when the header type connectors 74, 75 are mated with the connector housings 12T, 12B to form the connector, *i.e.,* when they are inserted into the hollow recess 77, a gap exists between the connector housing 12T, 12B and the header type connectors 73, 74, as is clearly shown in Figure 6B of Roath et al., an annotated copy of which is reproduced below:

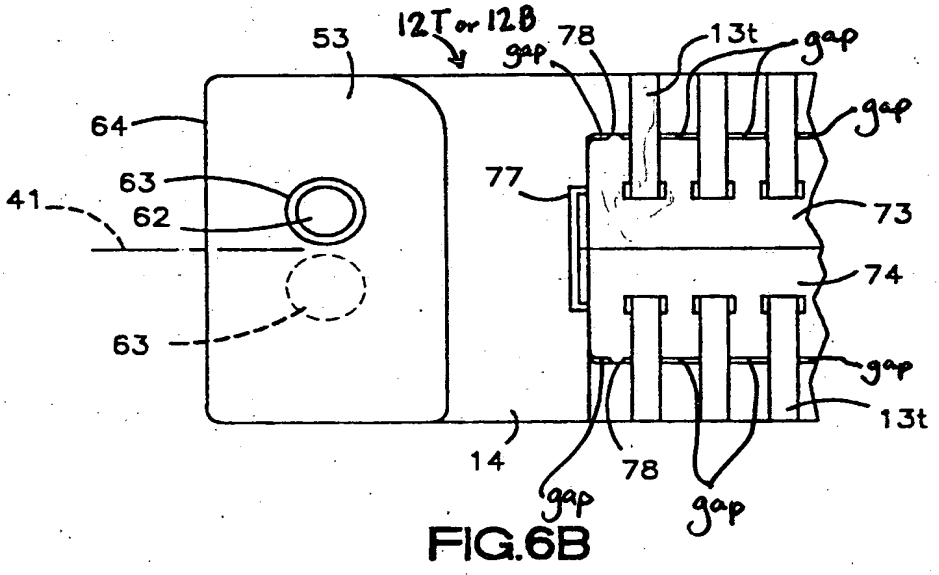

FIG.6B

Thus, for at least these reasons, applicant contends that the Examiner erred in concluding that Roath et al. anticipated the applicant's invention under 35 U.S.C. § 102(b) as claimed by the applicant in claims 1-11 and 13-27.

---

[1]Should the Examiner seek to characterize the hollow recess 77 of Roath et al. as being analogous to the housing receptacles of the present invention, Roath et al. would still fail as an anticipating reference as Roath et al. only discloses a single hollow recess 77, and representative claim 1 recites a plurality of receptacles.

D. The Combination of Roath et al. and Laub Does Not Render Claim 12 Obvious Under 35 U.S.C. § 103(a)

The Examiner rejected claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Roath et al. in view of Laub. Claim 12 is ultimately dependent on independent claim 1, which the applicant has argued above is not anticipated by Roath et al. for at least the reasons stated above. Moreover, Laub does not overcome the shortcomings of Roath et al. recited above. Thus, the combination of Roath et al. and Laub cited by the Examiner does not establish a *prima facie* case of obviousness. Accordingly, the Examiner erred in rejecting claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Roath et al. in view of Laub for at least the above reason.

IX. CONCLUSION

For all of the above reasons, it is respectfully submitted that the appealed claims do define an electrical connector that is not disclosed in or suggested by the relied on references. Thus, it is respectfully submitted that the Examiner's rejection of the claims on appeal should not be sustained and therefore should be reversed.

Respectfully submitted,
MOLEX INCORPORATED

Date: May 1, 2003 By: Robert J. Zeitler

Robert J. Zeitler
Registration No. 37,973
Attorney of Record

Mailing Address:
Robert J. Zeitler
MOLEX INCORPORATED
2222 Wellington Court
Lisle, Illinois 60532
Tel.: (630) 527-4884
Fax.: (630) 416-4962

IN UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants: Kent E. Regnier

Application: CONNECTOR HAVING SUPPORTIVE BARRIER COMPONENTS

Serial No.: 09/482,135

Filing Date: January 12, 2000

Art Unit: 2839

Examiner: C. Prasad

Case: 99-247 US

APPENDIX A

1. An electrical connector, comprising:

a dielectric housing having a plurality of substantially open receptacles arranged in an array which is suitable for an electrical connector, each said receptacle having a through axis;

a plurality of electrically conductive contacts positioned within at least some of said receptacles so as to provide an array of contacts arranged to be suitable for an electrical connector;

a plurality of retention members within the receptacle, at least one of said retention members engaging at least one of said contacts so as to impart an ungapped condition to the connector at the location of the retention member within the housing; and

said ungapped condition of the connector substantially prevents passage of liquid through the open receptacles having said retention members therewithin.

2. The electrical connector in accordance with claim 1, wherein said retention member has an opening therethrough, and said electrically conductive contact is positioned through said retention member opening and substantially fills said opening.

3. The electrical connector in accordance with claim 2, wherein said receptacle of the

housing has a stop surface within the receptacle, and wherein said retention member is between said stop surface and a portion of said electrically conductive contact.

4. The electrical connector in accordance with claim 1, wherein said electrically conductive contact has a first portion and a generally opposing second portion, a demarcation between said first and second portions of the contact being generally at said retention member, said first and second portions being at least partially within said housing, and said retention member is in contact with the respective first and second portions within the housing to thereby contribute to said ungapped condition.

5. The electrical connector according to claim 4, wherein said first portion of the electrically conductive contact generally lies along said through axis, while said second portion of the contact is at an acute angle relative to said through axis.

6. The electrical connector according to claim 1, wherein said ungapped condition imparts compliant and stable mount characteristics to said contacts.

7. The electrical connector according to claim 1, wherein said array of contacts is in a 1 mm grid.

8. The electrical connector according to claim 1, wherein said array of contacts is in a 0.05 inch grid.

9. The electrical connector according to claim 1, wherein said contact has a terminal portion is bent after insertion into said receptacle.

10. The electrical connector according to claim 9, wherein said formed terminal portion had been subjected to post-assembly bending for terminal retention.

11. The electrical connector according to claim 1, wherein said dielectric housing is a

unitary member.

12. The electrical connector according to claim 1, wherein said dielectric housing includes a plurality of housing component strips.

13. The electrical connector according to claim 1, wherein said retention member has an opening therethrough, and a portion of said contact is within and in engagement with said retention member opening.

14. The electrical connector according to claim 1, wherein said retention member has an external surface which engages said receptacle.

15. The electrical connector according to claim 14, wherein said receptacle has a stop surface, and said retention member external surface abuts said stop surface.

16. The electrical connector according to claim 14, wherein said receptacle has an interior surface which is generally parallel to said through axis, and said retention member external surface abuts said receptacle interior surface.

17. The electrical connector according to claim 13, wherein said retention member has an external surface which engages said receptacle, and a force fit condition is present between said contact portion and said retention member opening and between said receptacle and said retention member external surface.

18. The electrical connector according to claim 17, wherein a force fit condition is present between said receptacle interior surface and said retention member external surface.

19. The electrical connector according to claim 1, wherein said retention member is resilient.

20. The electrical connector according to claim 19, wherein said retention member is compressed within said receptacle.

21. The electrical connector according to claim 1, wherein said contact has a land contact surface at one end thereof and a deflective terminal at an opposite end thereof.

22. An electrical connector, comprising:

a dielectric housing having a plurality of substantially open receptacles arranged in an array which is suitable for an electrical connector, each said receptacle having a through axis;

a plurality of electrically conductive contacts positioned within at least some of said receptacles so as to provide an array of contacts arranged to be suitable for an electrical connector;

a plurality of retention members within the receptacle, at least one of said retention members engaging at least one of said contacts so as to impart an ungapped condition to the connector at the location of the retention member within the housing;

a retention member opening through said retention member, said electrically conductive contact being positioned through said retention member opening so as to substantially fill said opening;

said electrically conductive contact has a first portion and a generally opposing second portion, a demarcation between said first and second portions of the contact being generally at said retention member, said first and second portions being at least partially within said housing, and said retention member is in contact with the respective first and second portions within the housing to thereby contribute to said ungapped condition; and

said ungapped condition of the connector substantially prevents passage of liquid through the open receptacles having said retention members therewithin and provides compliant mounting of said contact within said receptacle.

23. The electrical connector in accordance with claim 22, wherein said receptacle of the housing has a stop surface within the receptacle, and wherein said retention member is between said stop surface and a portion of said electrically conductive contact.

24. The electrical connector according to claim 22, wherein said formed terminal portion is bent after insertion into said receptacle.

25. The electrical connector according to claim 22, wherein said retention member has an external surface which engages said receptacle, said receptacle has a stop surface, and said retention member external surface abuts said stop surface, said receptacle has an interior surface which is generally parallel to said through axis, and said retention member external surface abuts said receptacle interior surface.

26. The electrical connector according to claim 22, wherein said retention member is resilient and is compressed within said receptacle.

27. The electrical connector according to claim 22, wherein said contact has a land contact surface at one end thereof and a deflective terminal at an opposite end thereof.